

REMARKS

Claims 1-47 remain pending in the application. Favorable reconsideration is respectfully requested in view of the above amendments and the following remarks.

Claims 1-9, 24-32, and 47 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Orava (U.S. 6,829,288) in view of Awater et al. (U.S. Pub. 2002/0110105, hereinafter “Awater ‘105”). This rejection is respectfully traversed.

The invention relates to packet-based communications and more particularly to correlation of access codes in packet-based communication systems. As described in the Background section of the application beginning on page 3, for a proper operation of a channel such as the Bluetooth™ hopping channel, the master and the slave have to remain in FH synchrony. The frequency hopping is driven by the native clock of the master of the piconet. At each packet reception, the slave adjusts its clock offset such that the input of the hop selection mechanism is aligned with the input in the master. The slaves use a special synchronization word, called the access code, which precedes the Bluetooth™ packets for timing resynchronization. In a piconet, each radio packet exchanged between the master and the slaves is preceded by this access code derived from the Bluetooth® device address (“BD_ADDR”) of the master. Only packets with the proper access code are accepted by the recipient. The access code is further used for bit and frame synchronization and to adjust the slave clock offset (with respect to the master clock) in order to remain FH synchronized to the master. *In the receiver, the received symbol sequence representing the access code is compared with the desired access code (i.e., the reference code). When sufficient symbols (e.g., bits) match, successful reception of the access code is indicated and the synchronization parameters are updated.*

Due to disturbances on the propagation channel, it is expected that some symbols in the received access code might be in error. To accommodate such an operating environment, the system is designed to declare successful reception of an access code even if a number of symbols are erroneous. A threshold k is defined, indicating how many symbols may be in error without preventing a successful access code reception from being indicated. If N is the total number of symbols, then $k \leq N$. If the number of matching symbols is less than k , the access code is rejected. If the desired access code was present, but was rejected because of too many errors, this is called a *False Rejection*. The false rejection (*FR*) rate depends not only on the symbol error rate but also on the threshold k : the higher k , the less errors are tolerated and the higher the *FR* rate. By lowering k , the *FR* rate is reduced. However, k

cannot be chosen too low, as in that case random bit sequences (noise) or other access codes may trigger the receiver; that is, the receiver may think that the correct access code has arrived, when in fact only noise or an incorrect access code have been received. This situation is called a *False Alarm*. The false alarm rate increases as k is lowered. Clearly there is an optimal threshold k which couples a low *FR* rate to an acceptable *FA* rate.

The discussion so far has considered only the use of the access code in connection with maintaining synchrony between the master and the slave after a connection has been established (referred to herein as "traffic mode"). However, in Bluetooth® systems, the access code is also used during the connection establishment or acquisition mode. This mode is generally referred to as "scan mode." The access code plays a dominant role in the connection setup. In this case too, *the received signal is compared with a reference code and only if there is sufficient agreement between the received signal and the reference will the receiver indicate the successful reception of the access code*. Again, a threshold k is defined indicating the minimum number of symbols that must match before a successful reception is indicated. As in the ongoing-connection mode (referred to more generally herein as "traffic mode"), the threshold will determine the False Alarm and False Rejection rates.

Applicant has recognized that the requirements on *FA* and *FR* during the scan mode are completely different from the *FA* and *FR* during the traffic mode. In traffic mode, the *FR* is crucial as it directly has an impact on the overall packet error rate. Therefore, a low threshold k is desirable. In the scan mode, *FA* is crucial as it affects the power consumption in the idle state. To avoid starting the system on a wrong access code, or even on noise, a high threshold k is desirable. Clearly, there are contradictory requirements in the receiver regarding the match of the received signal with respect to the reference code.

Embodiments defined by independent claims 1, 24, and 47 address this problem by, *inter alia*, using a threshold adaptation strategy that includes:

- setting a threshold level to a first value if the receiver is in a scan mode;
- setting the threshold level to a second value if the receiver is in a traffic mode, wherein the second value corresponds to a lower degree of correlation than the first value; and
- comparing the correlation value (i.e., a correlation value generated by correlating the received signal with a reference code) with the threshold level.

Thus, in accordance with this aspect of the variously claimed embodiments, a communication device / method / machine readable storage medium considers the mode of operation (i.e., scan mode vs. traffic mode) and sets a threshold level accordingly, wherein the threshold value serves as a standard against which a correlation value is compared, the correlation value being one that is generated by correlating the received signal with a reference code. Reception of the access code is indicated only if the correlation value compares favorably with the threshold level.

The variously claimed embodiments are believed to be both novel and nonobvious over the Orava and Awater '105 documents at least because the combination of these documents still lacks any teaching or suggestion of the features discussed above.

The Office correctly acknowledges that Orava does not show logic that sets a threshold level to a first value if the receiver is in a scan mode and logic that sets the threshold level to a second value if the receiver is in a traffic mode, wherein the second value corresponds to a lower degree of correlation than the first value (see page 3 of the Office Action). Instead, the threshold value used in the Orava arrangement appears to be static. (This is inferred by Orava's failure to describe a dynamically changeable threshold). The Office now relies on Awater '105 as making up for these deficiencies. This reliance is unfounded for at least the following reasons.

Awater '105 similarly fails to describe using a dynamically changeable threshold, wherein the threshold value serves as a standard against which a correlation value is compared, the correlation value being one that is generated by correlating the received signal with a reference code. Consequently, any combination of Orava with Awater '105 would still lack these features, and would therefore be incapable of supporting an obviousness rejection against Applicant's claims.

In support of its rejection, the Office argues that

Awater also teaches in Bluetooth environment and improves on the roaming procedure for mobile devices when switching from one access point to another by applying a weight (i.e., threshold level) to an equation to be used by the mobile device wherein the weight depends on the state the mobile device is in (i.e., connect state reading on traffic mode or scan state reading on scan mode) thus allowing the mobile to switch to an

access point that provides the best overall quality (paragraphs 0089-0091, 0110).

The Office's argument overlooks the fact that Awater 105's weight function merely influences the combined communication quality and load (CQL) value, which in turn influences whether a handover will be performed. (See, e.g., Awater '105 at paragraphs 0097-0099.) However, the CQL value has no influence over whether the terminal considers a reference code to have been present in a received signal, as would be required to satisfy the terms of Applicant's claims. That is, even if the teachings of Awater '105 were to be incorporated into the arrangement of Orava, as now suggested by the Office, the result would be a terminal capable of making handover decisions based, in part, on whether the terminal is in a "connected scan state" or a "searching scan state". However, how handover decisions are made in no way affects whether the terminal considers its reference code to have been present in a received signal because Awater '105's dynamically changeable CQL value (and dynamically changeable threshold -- see paragraph 0096) is not one against which the correlation value is compared. Orava's correlation value would still be compared against the static threshold taught in Orava.

The Office Action includes a statement that "[t]he Examiner notes that paragraphs 0089 and 0119 disclose that the connect state may have a weight value larger than the scan state which is an obvious design choice." It is believed that this statement is intended to explain why the Awater '105 document in fact teaches the opposite of what Applicant claims (Applicant's claims define "the second value corresponds to a lower degree of correlation than the first value" - emphasis added). Applicant strongly disagrees that one can merely brush aside this distinction as merely being a design choice. The strategy for setting Awater '105's weight value is different from that of Applicant's strategy for setting the claimed threshold value because Awater '105's weight value is designed to achieve a very different purpose than that of Applicant's threshold value. Hence, one would not expect them to be set the same way, and modifying one to match the other could result in a non-working embodiment.

Given these deficiencies in Awater '105, it is apparent that even if the teachings of Awater '105 were to be combined with those of Orava, the combination would still fail to include "setting a threshold level to a first value if the receiver is in a scan mode; setting the threshold level to a second value if the receiver is in a traffic mode, wherein the second value

corresponds to a lower degree of correlation than the first value; [and] comparing the correlation value with the threshold level”, as defined by each of independent claims 1, 24, and 47.

For at least the foregoing reasons, it is respectfully asserted that the subject matter defined by each of independent claims 1, 24, and 47, as well as that defined by their various dependent claims 2-9 and 25-32, is patentably distinguishable over the Orava and Awater ‘105 publications, regardless of whether these documents are considered individually or in combination. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. §103(a) be withdrawn.

Claims 22-23 and 45-46 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Orava in view of Awater ‘105 and further in view of Awater et al. (U.S. Pub. No. 2005/0152317, hereinafter “Awater ‘317”). This rejection is respectfully traversed.

Claims 22-23 and 45-46 variously depend from independent claims 1 and 24, and are therefore patentably distinguishable over any combination of the Orava and Awater ‘105 documents for at least the reasons set forth above.

The Awater ‘317 document fails to make up for the deficiencies of Orava and Awater ‘105 at least because it, too, fails to disclose or suggest:

- setting a threshold level to a first value if the receiver is in a scan mode;
- setting the threshold level to a second value if the receiver is in a traffic mode, wherein the second value corresponds to a lower degree of correlation than the first value; and
- comparing the correlation value (i.e., a correlation value generated by correlating the received signal with a reference code) with the threshold level.

Therefore, any combination of Orava, Awater ‘105, and Awater ‘317 would similarly lack these features and be incapable of supporting an obviousness rejection against Applicant’s claims.

The distinctions between the presently claimed invention and the Awater ‘317 document were presented in Applicant’s Response previously filed on September 6, 2007, and those arguments are expressly incorporated herein by reference. The Office’s issuance of the new grounds of rejection presented in this most recent Office Action is taken as evidence that the Office agrees with Applicant’s prior characterization of the Awater ‘317 document.

For at least the foregoing reasons, it is respectfully asserted that the subject matter defined by each of dependent claims 22-23 and 45-46 is patentably distinguishable over the Orava, Awater '105 and Awater '317 publications, regardless of whether these documents are considered individually or in combination. Accordingly, it is respectfully requested that the rejection of these claims under 35 U.S.C. §103(a) be withdrawn.

Claims 10-21 and 33-44 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Orava in view of Awater '105 and Awater '317, and further in view of Brommer (U.S. Pub. 2003/0026356). This rejection is respectfully traversed.

Claims 10-21 and 33-44 variously depend from independent claims 1 and 24, and are therefore patentably distinguishable over any combination of the Orava, Awater '105, and Awater '317 publications for at least the reasons set forth above with respect to those base claims.

Brommer fails to make up for the deficiencies of Orava, Awater '105, and Awater '317 at least because it, too, fails to disclose

- setting a threshold level to a first value if the receiver is in a scan mode;
- setting the threshold level to a second value if the receiver is in a traffic mode, wherein the second value corresponds to a lower degree of correlation than the first value; and
- comparing the correlation value (i.e., a correlation value generated by correlating the received signal with a reference code) with the threshold level.

Consequently, any combination of Orava, Awater '105, Awater '317, and Brommer would similarly fail to include at least these features.

Further, the Office accurately acknowledges that, regarding the various features defined by claims 10-21 and 33-44, “Orava in view of Awater (2002/0110105) and Awater (2005/0152317) do not show the second value is dynamically determined and adjusted as a function of QoS.” However, the Office then supports its rejection of these claims by stating that “Brommer teaches in the Bluetooth environment ... wherein QoS is used to dynamically assign communication channels (paragraphs 0022, 0089-0104).” The Office then argues that “[i]t would have been obvious for any one of ordinary skill in the art at the time of invention to consider interference and noise as taught by Brommer into the teachings of Orava in view of Awater (2002/0110105) and Awater (2005/0152317) so as to dynamically assign communication channels to wireless devices while maximizing the effective bandwidth.”

The Office's argument is seriously flawed because *it does not address any of the features actually defined by claims 10-21 and 33-44*. Importantly, Applicant's claims are *not* directed to "dynamically assign[ing] communication channels to wireless devices," so whether Brommer shows this is irrelevant to the issue of patentability of claims 10-21 and 33-44.

Rather, Applicant's claims are directed to dynamically setting a threshold value based upon whether a communication device is operating in a scan mode or in a traffic mode, wherein the threshold value is used to determine whether there is sufficient correlation between a received signal and a reference code to assert that a packet has been detected. The Brommer publication is silent with respect to changing threshold values, and therefore fails to make up for the deficiencies of the Orava, Awater '105, and Awater '317 publications.

For at least the foregoing reasons, claims 10-21 and 33-44 are believed to define subject matter that is patentably distinguishable over that which is disclosed in the Orava, Awater '105, Awater '317, and Brommer documents, regardless of whether these documents are considered individually or in any combination. Accordingly, it is respectfully requested that the rejection of claims 10-21 and 33-44 be withdrawn.

The application is believed to be in condition for allowance. Prompt notice of same is respectfully requested.

Respectfully submitted,
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